

Attorney Docket No. 21723-0002
Application Serial No. 10/643,689

AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions, and listings of claims in the Application.

1. (Currently Amended) A plate heat exchanger comprising:
 - a plurality of plates, each plate having opposed surfaces and perimeter flanges, for providing at least one flow path for each of at least two fluids, wherein facing surfaces and perimeter flanges of a pair of adjacent plates of the plurality of plates define a flow path for each fluid of the at least two fluids, and wherein opposed surfaces of at least one plate of each pair of adjacent plates provides a flow path boundary for two fluids of the at least two fluids, the at least one plate having a high thermal conductivity and providing a portion of the flow path boundary for two fluids of the at least two fluids, thereby providing thermal communication between the two fluids on the opposed surfaces of the plate;
 - an inlet and outlet for each fluid of the at least two fluids, the inlet and outlet for each fluid being in fluid communication with each flow path for said fluid;
 - at least one insert member having a plurality of surface microfeatures, the at least one insert member disposed in fluid communication with at least a portion of at least one flow path for at least one fluid, facing surfaces of the at least one insert member and one of the pair of adjacent plates of the plurality of plates being substantially immediately adjacent, the plurality of surface microfeatures for providing enhanced heat transfer between the at least two fluids, the at least one plate forming a portion of the flow path boundary.
2. (Original) The plate heat exchanger of claim 1 wherein the plurality of surface microfeatures have geometric attributes.
3. (Original) The plate heat exchanger of claim 1 wherein at least a portion of the plurality of surface microfeatures are interconnected.
4. (Original) The plate heat exchanger of claim 1 wherein the plurality of surface microfeatures correspond to openings sufficiently large to prevent entrapment of a lubricating oil.

Attorney Docket No. 21723-0002
Application Serial No. 10/643,689

5. (Original) The plate heat exchanger of claim 1 wherein the plurality of surface microfeatures correspond to openings from about 0.002 inches to about 0.050 inches.
- 6.-9. (Cancelled)
10. (Currently Amended) The plate heat exchanger of claim ~~[[9]]~~ 1 wherein the plurality of microfeatures includes a plurality of apertures formed therein, each aperture corresponding to a nodal contact between facing surfaces of the adjacent plates of the plurality of plates.
11. (Original) The plate heat exchanger of claim 10 wherein the plate heat exchanger is of brazed construction comprising the insertion of at least one foil plate between the adjacent plates of the plurality of plates, the at least one foil plate becoming molten and flowing between adjacent plates of the plurality of plates to form brazed nodal contacts between facing surfaces of the adjacent plates of the plurality of plates when the plate heat exchanger is heated to a predetermined temperature below the melting point of the adjacent plates of the plurality of plates, but above the melting temperature of the at least one foil plate, the at least one insert member having a coating layer applied to the surfaces of the at least one insert member to substantially prevent molten metal from the foil plate from flowing into the plurality of microfeatures of the at least one insert member.
12. (Original) The plate heat exchanger of claim 10 wherein the coating layer is an oxide coating.
13. (Original) The plate heat exchanger of claim 10 wherein the coating layer is an oxide coating selected from the group consisting of nickel oxide, chromium oxide, aluminum oxide, and zirconium oxide or combinations thereof.
14. (Cancelled)
15. (Currently Amended) The plate heat exchanger of claim ~~[[9]]~~ 1 wherein the at least one insert member is an insert plate.
16. (Currently Amended) The plate heat exchanger of claim ~~[[9]]~~ 1 wherein facing surfaces of the at least one insert member and one of the pair of adjacent plates of the plurality of plates are separated by a gap.
17. (Original) The plate heat exchanger of claim 16 wherein the gap is angular.

Attorney Docket No. 21723-0002
Application Serial No. 10/643,689

18. (Original) The plate heat exchanger of claim 16 wherein the gap is formed by a plurality of spacers interposed between facing surfaces of the at least one insert member and one of the pair of adjacent plates of the plurality of plates.

19. (Currently Amended) The plate heat exchanger of claim [[9]] 1 wherein the at least one insert member is a mesh.

20. (Original) The plate heat exchanger of claim 19 wherein the mesh is of unitary construction.

21. (Original) The plate heat exchanger of claim 20 wherein the cross sectional profile of a member of the mesh is non-circular.

22. (Original) The plate heat exchanger of claim 19 wherein the mesh includes a backing layer.

23. (Original) The plate heat exchanger of claim 22 wherein the backing layer is comprised of a metal.

24. (Original) The plate heat exchanger of claim 22 wherein the backing layer extends past opposed edges of the mesh and then folds over the opposed edges.

25. (Currently Amended) The plate heat exchanger of claim 19 wherein the ~~at least one~~ mesh has openings from about 0.0001 inches to about 0.050 inches.

26. (Currently Amended) The plate heat exchanger of claim 19 wherein the ~~at least one~~ mesh has openings from about 0.002 inches to about 0.050 inches.

27. (Original) The plate heat exchanger of claim 19 wherein the mesh is comprised of a plurality of mutually transverse interwoven members.

28. (Original) The plate heat exchanger of claim 19 wherein the cross sectional profile of a member of the mesh is non-circular.

29. (Currently Amended) The plate heat exchanger of claim 19 wherein the ~~at least one~~ mesh comprises a plurality of stacked mesh layers.

30. (Original) The plate heat exchanger of claim 29 wherein the plurality of stacked mesh layers is about a 400 mesh first layer and about a 100 mesh second layer.

Attorney Docket No. 21723-0002
Application Serial No. 10/643,689

31. (Original) The plate heat exchanger of claim 29 wherein the plurality of stacked mesh layers is about a 400 mesh first layer and about a 400 mesh second layer.

32. (Original) The plate heat exchanger of claim 29 wherein the plurality of stacked mesh layers is about a 400 mesh first layer, about a 100 mesh second layer and about a 100 mesh third layer.

33.-39. (Cancelled)

40. (Currently Amended) A method for providing an enhanced heat transfer surface for use with a plate heat exchanger including a plurality of plates, each plate having opposed surfaces and perimeter flanges, for providing at least one flow path for each of at least two fluids, wherein facing surfaces and perimeter flanges of a pair of adjacent plates of the plurality of plates define a flow path for each fluid of the at least two fluids, and wherein opposed surfaces of at least one plate of the pair of adjacent plates provides a flow path boundary for two fluids of the at least two fluids, the at least one plate providing a flow path boundary having a high thermal conductivity, thereby providing thermal communication between the two fluids on the opposed surfaces of the plate, an inlet and outlet for each fluid of the at least two fluids, the inlet and outlet for each fluid being in fluid communication with each flow path for said fluid, the step comprising:

placing at least one insert member having a plurality of surface microfeatures between at least one pair of facing surfaces of adjacent plates of the plurality of plates defining a fluid flow path, facing surfaces of the at least one insert member and one of the pair of adjacent plates of the plurality of plates being substantially immediately adjacent.